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Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

February 2003

Although the primary metals leading index decreased in January, its performance in recent months suggests the possibility of modest growth in domestic metals industry activity in the near term. The leading index of metal prices posted its second consecutive increase in December.

The **primary metals leading index** fell 1.8% in January, down to 128.3 from a revised 130.7 in December. The index's 6-month smoothed growth rate dropped to –0.8% from a revised 3.1% in December. The 6-month smoothed growth rate is a compound annual rate that measures the near-term trend. Normally, a growth rate above +1.0% signals an upward trend for future growth in metals activity, while a rate below –1.0% indicates a downward trend.

Because only four of the leading index's eight components were available in time to compute the January index value, it should be considered preliminary. An unusually large 0.7-hour decrease in the length of the average workweek in primary metals establishments was responsible for most of the January drop in the leading index. The stock price component, which combines the S&P stock price indexes for construction and farm machinery companies and for industrial machinery companies, and the Institute for Supply Management's PMI, an index of manufacturing activity, also moved lower. In contrast, the JOC-ECRI metals price index growth rate moved up for the first time in 3 months.

The movements of the leading index's growth rate in recent months suggest that growth in primary metals industry activity will be modest in the near term.

Following 2 months with little change, the **steel leading index** surged 2.6% in December, the latest month for which it is available, up to 114.8 from 111.9 in November. That is the largest monthly increase in almost two decades and is the second highest level on record for this index, exceeded only by January 2000. The index's 6-month smoothed growth rate climbed to 4.0% from a revised –0.6% in November. Four of the index's nine components registered strong gains in December, led by an exceptionally large 1.4-hour increase in the length of the average workweek in steel mills. Other strong gains were posted by retail sales of U.S. passenger cars and light trucks, the PMI, and the index of permits for new housing units. Although the December increase was very strong, it remains to be seen if the domestic steel industry will experience increased growth in activity.

The **aluminum mill products leading index** rose 1.8% in December, up to 171.6 from a revised 168.6 in November. Meanwhile, the index's 6-month smoothed growth rate increased to 2.0% from a revised –1.3% in November, its first reading above +1.0% since last June. Four of the index's seven components registered strong gains in December, with retail sales of U.S. passenger cars and light trucks and the PMI showing the largest increases. The largest negative factor was a decrease in new orders for aluminum mill products. More months of data will be needed to see if the aluminum mill products leading index is beginning to signal stronger growth in domestic industry activity in the months ahead.

The **primary aluminum leading index** gained 1.6% in December, climbing to 85.1 from a revised 83.8 in November. That marked the third consecutive strong gain in the leading index. The index's 6-month smoothed growth rate soared to 6.6% from a revised 3.9% in November, its highest growth rate since September 1999. Again in December, an unusually large increase in the length of the average workweek in primary aluminum establishments was responsible for much of the strength in the leading index. The growth rate of the leading index points to continued growth in the domestic primary aluminum industry activity in the near term.

The **copper leading index** advanced 1.2% in December to 115.7 from a revised 114.3 in November, its first increase in 7 months. The index's 6-month smoothed growth rate rose to –2.1% from a revised –4.2% in November. Two components, average weekly overtime hours in copper rolling, drawing, and extruding establishments and the index of new housing permits, were responsi-

ble for most of the net increase in the leading index. Despite increasing in December, the growth rate of the copper leading index still does not point to a near-term increase in U.S. copper industry activity.

Second Increase in a Row for Metals Price Leading Index

The **metals price leading index** advanced 0.4% in December to 112.0 from a revised 111.5 in November, its second monthly increase in a row. The index's 6-month smoothed growth rate increased to 0.7% from a revised 0.3% in November.

Three of the leading index's four components were available in time to compute the December index value, and all three posted modest gains. The fourth index component, the growth rate of the Economic Cycle Research Institute's (ECRI) 18-Country Long Leading Index, was available only through November, when it remained unchanged from October. The ECRI index signals economic activity for major industrialized countries about 5 months in advance.

The growth rate of the inflation-adjusted value of inventories of U.S. nonferrous metal products, an indicator of the supply of metals, edged up to –16.7% in December from a downwardly revised –17.0% in November. The actual level of these inventories moved down in December, the 12th decline in 13 months. This indicator usually moves inversely with metal prices.

The metals price leading index and the growth rate of U.S. nonferrous metal products inventories are giving a weak signal that overall metal prices could move higher in the months ahead. The business cycle and inventories are only two factors in metals price determination. Other factors that affect prices include changes in metals production, speculation, foreign exchange rates, strategic stockpiling, geopolitical instability, and production costs.

Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

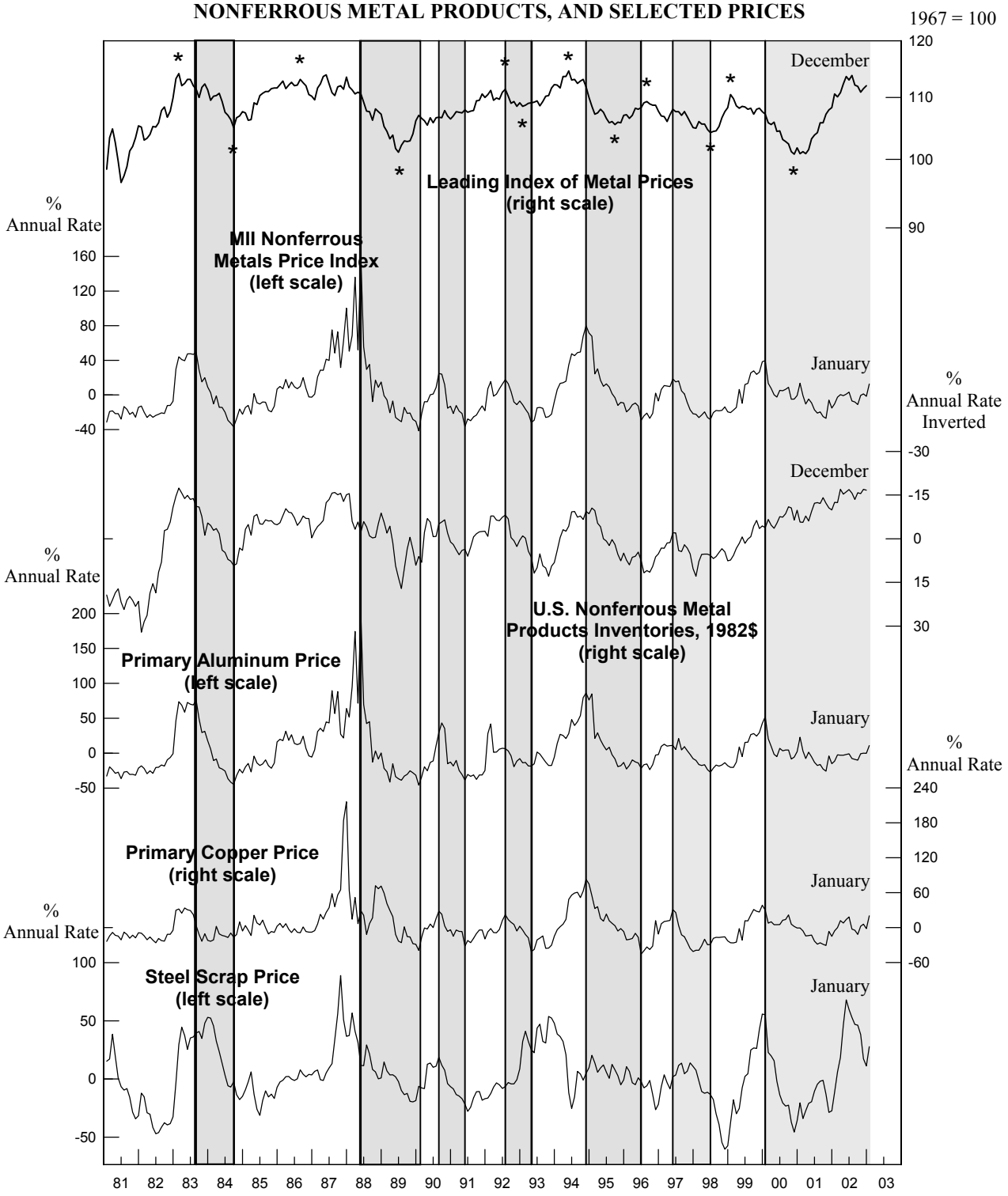
		Six-Month Smoothed Growth Rates				
	Leading Index of Metal Prices (1967=100)	MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982$)	Primary Aluminum	Primary Copper	Steel Scrap
2001						
December	108.3r	-15.1	-9.9	-15.1	-15.1	-27.4
2002						
January	110.6r	-10.3	-12.5	-11.3	-5.8	-11.3
February	110.1r	-2.6	-12.4	-2.5	0.0	6.0
March	110.8	0.5	-17.0	-3.0	12.0	18.5
April	112.3	-0.9	-15.3	-2.9	7.7	46.4
May	113.6r	0.9	-16.1	-1.8	13.8	68.0
June	113.0	3.3	-16.9	-0.9	18.3	59.8
July	113.8r	-6.9	-15.7	-7.7	-2.5	52.9
August	112.1	-8.0	-13.5r	-8.9	-4.8	46.8
September	111.9r	-11.0	-15.8r	-10.1	-11.7	46.2
October	110.9r	-0.5	-15.5	-0.8	2.3	38.2
November	111.5r	1.3	-17.0r	0.0	5.7	17.4
December	112.0	-1.6	-16.7	-0.4	-1.8	11.2
2003						
January	NA	12.7	NA	10.8	20.2	27.8

NA: Not available *r: Revised*

Note: The components of the Leading Index of Metal Prices are the spread between the U.S. 10-year Treasury Note and the federal funds rate, and the 6-month smoothed growth rates of the deflated value of new orders for nonferrous metal products, the Economic Cycle Research Institute's 18-Country Long Leading Index, and the reciprocal of the trade-weighted average exchange value of the U.S. dollar against other major currencies. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metal products (NAICS 3313, 3314, & 335929). Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); U.S. Census Bureau; the Economic Cycle Research Institute, Inc. (ECRI); and Federal Reserve Board.

CHART 1.
LEADING INDEX OF METAL PRICES AND GROWTH RATES OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF NONFERROUS METAL PRODUCTS, AND SELECTED PRICES



Shaded areas are downturns in the nonferrous metals price index growth rate. Asterisks (*) are peaks and troughs in the economic activity reflected by the leading index of metal prices. Scale for nonferrous metal products inventories is inverted.

U.S. Geological Survey, February 2003

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2002				
February	129.3	6.5	100.1	-6.6
March	129.9r	6.6r	100.8	-4.5
April	128.5r	3.8r	101.3	-2.8
May	130.0r	5.5r	101.4	-2.0
June	130.1r	4.9r	101.3	-1.4
July	128.2r	1.7r	100.7	-2.0
August	128.4r	1.5r	101.7r	0.5r
September	127.4r	-0.2r	100.6	-1.1
October	128.6r	1.4r	101.7r	1.5r
November	128.7	0.8	101.0r	0.3r
December	130.7r	3.1r	101.5	1.1
2003				
January	128.3	-0.8	NA	NA

NA: Not available *r: Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**December**	**January**
1. Average weekly hours, primary metals (SIC 33)	0.4r	-1.5
2. Weighted S&P stock price index, machinery, construction and farm and industrial (December 30, 1994=100)	0.1r	-0.4
3. Ratio of price to unit labor cost (SIC 33)	0.1	NA
4. JOC-ECRI metals price index growth rate	0.0r	0.4
5. New orders, primary metal products, (NAICS 331 & 335929) 1982$	0.1	NA
6. Index of new private housing units authorized by permit	0.4	NA
7. Growth rate of U.S. M2 money supply, 1996$	-0.2	NA
8. PMI	0.6r	-0.3
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	1.5r	-1.8

Coincident Index	**November**	**December**
1. Industrial production index, primary metals (NAICS 331)	-0.1r	0.3
2. Total employee hours, primary metals (SIC 33)	-0.3	0.2
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982$	-0.4r	-0.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.7	0.5

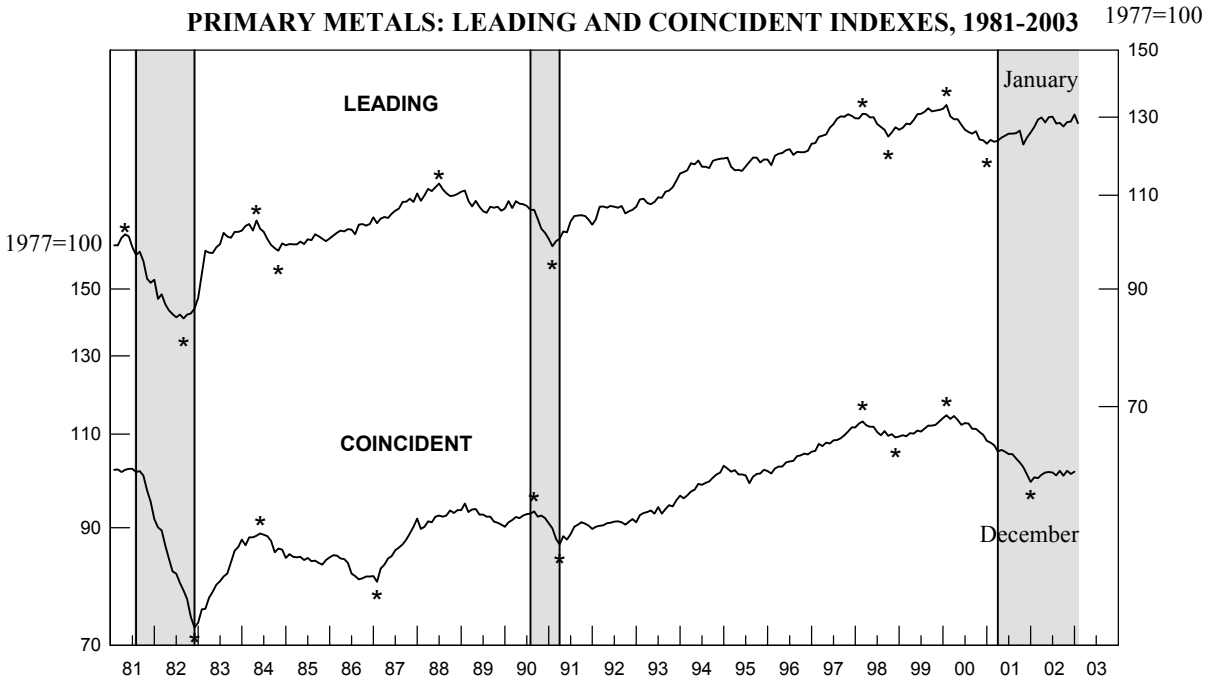
Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Journal of Commerce and Economic Cycle Research Institute, Inc.; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, Institute for Supply Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA: Not available *r: Revised*

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

CHART 2.

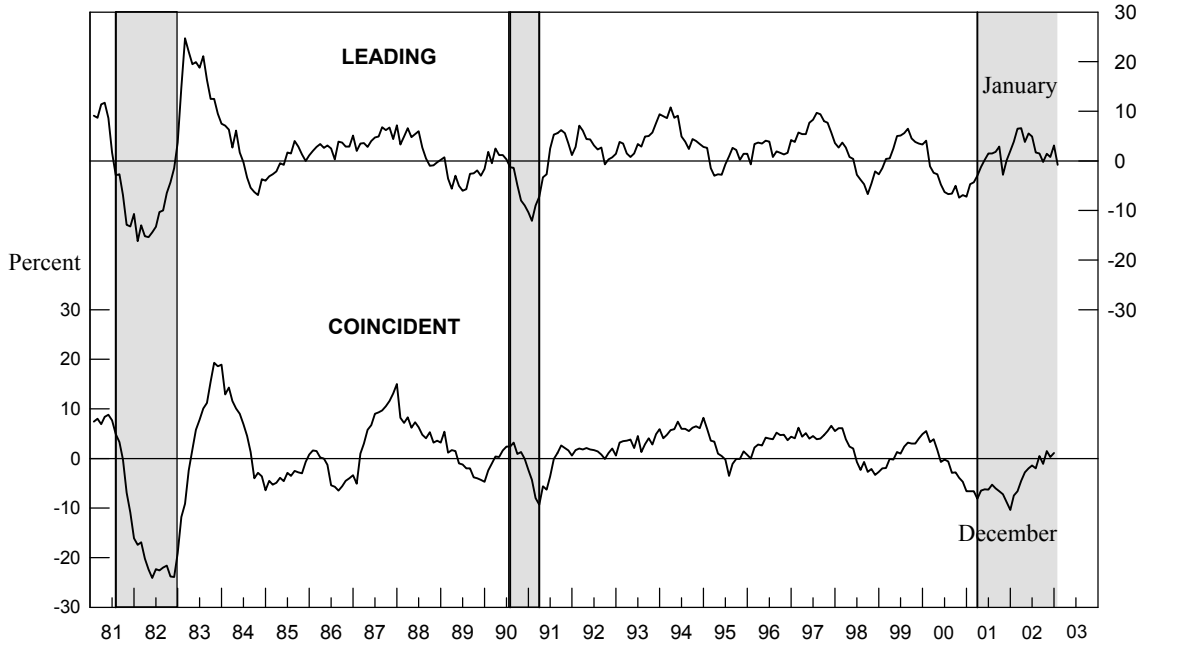
PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1981-2003



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 3.

PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1981-2003



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, February 2003

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2002				
January	111.3r	2.9r	94.2	-5.1
February	112.9	5.0	94.0	-4.9
March	112.3r	3.0r	94.5	-3.3
April	111.9r	1.7r	94.8	-2.3
May	113.3r	3.7r	95.6	-0.3
June	113.7r	3.7r	95.5	0.0
July	113.4r	2.7r	95.3	-0.1
August	112.8r	1.4r	96.6	2.9r
September	111.9r	-0.4r	95.9	1.5
October	111.8r	-0.4r	96.7r	3.2r
November	111.9	-0.6r	95.9r	1.5
December	114.8	4.0	97.5	4.6

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

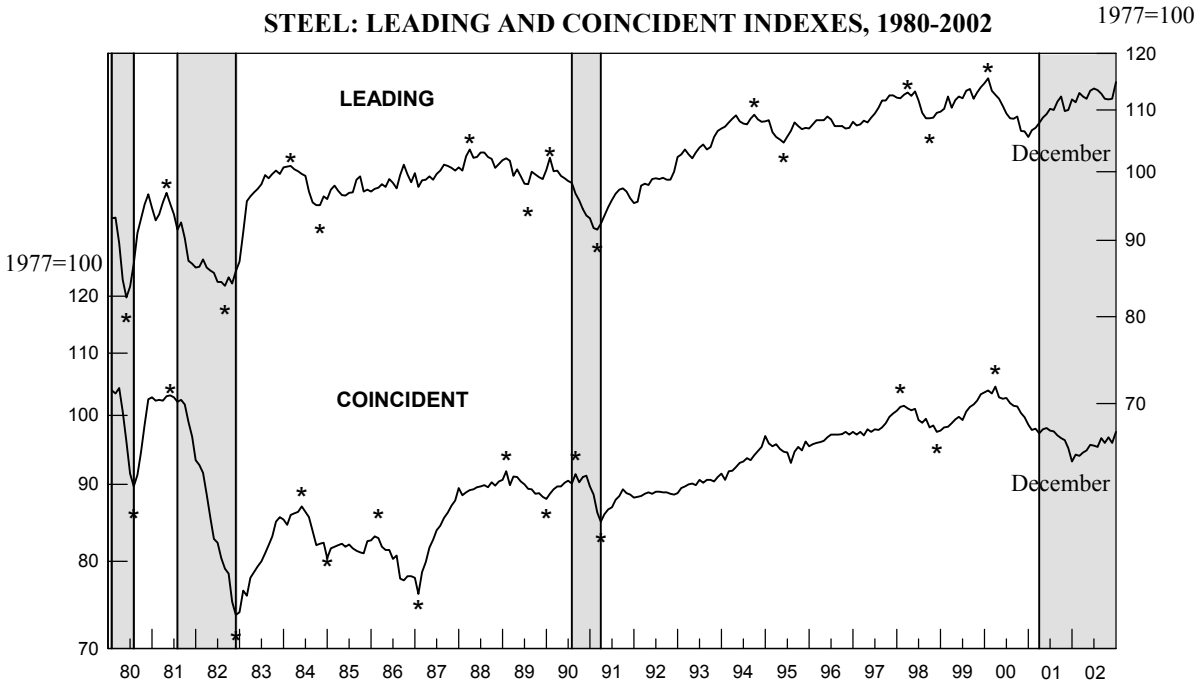
Leading Index	**November**	**December**
1. Average weekly hours, blast furnaces and basic steel products (SIC 331)	-0.6	1.0
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982$	-0.2	0.1
3. Shipments of household appliances, 1982$	0.3r	0.0
4. S&P stock price index, steel companies	0.2	-0.2
5. Retail sales of U.S. passenger cars and light trucks (units)	0.1	0.7
6. Growth rate of the price of steel scrap (#1 heavy melting, $/ton)	0.1	0.1
7. Index of new private housing units authorized by permit	-0.1	0.4
8. Growth rate of U.S. M2 money supply, 1996$	0.1r	-0.2
9. PMI	0.1	0.6
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.0	2.5
Coincident Index		
1. Industrial production index, iron and steel products (NAICS 3311 & 3312)	-0.2r	0.4
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982$	-0.1	0.2
3. Total employee hours, blast furnaces and basic steel products (SIC 331)	-0.7	1.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.9r	1.8

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey; 4, Standard & Poor's; 5, U.S. Bureau of Economic Analysis and American Automobile Manufacturers Association; 6, Journal of Commerce and U.S. Geological Survey; 7, U.S. Census Bureau and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, Institute for Supply Management. Coincident: 1, Federal Reserve Board; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

r: Revised

CHART 4.

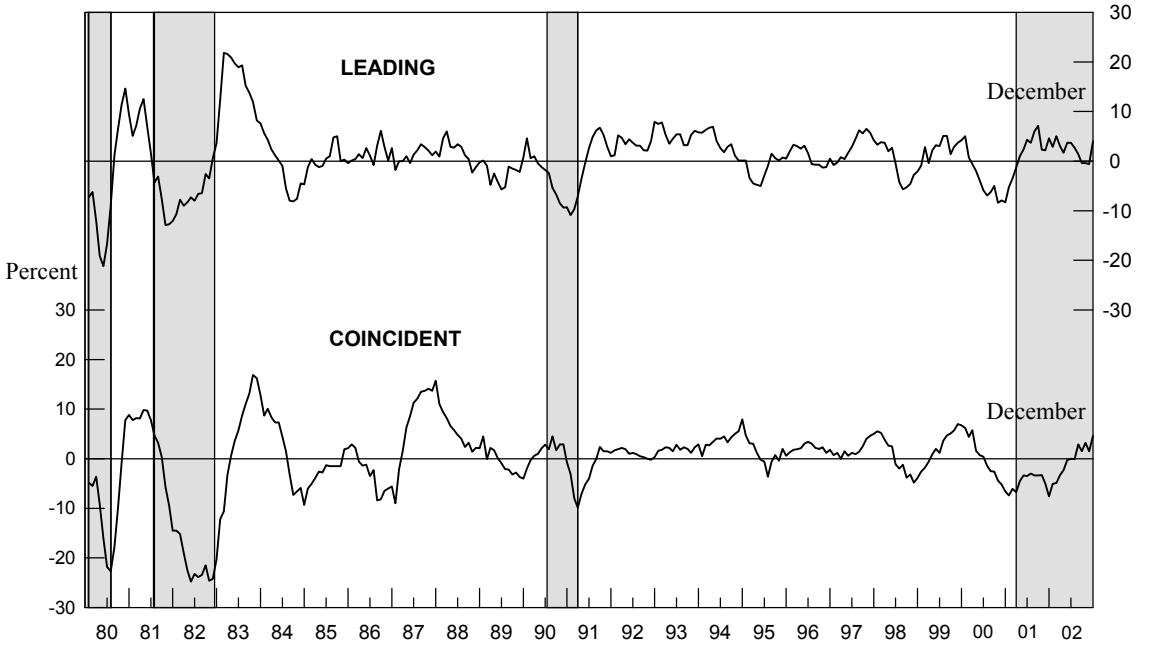
STEEL: LEADING AND COINCIDENT INDEXES, 1980-2002



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 5.

STEEL: LEADING AND COINCIDENT GROWTH RATES, 1980-2002



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, February 2003

Table 6.
The Aluminum Mill Products Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2002				
January	168.1r	1.9r	140.0	-2.6
February	172.7r	6.4	140.8	-1.3
March	170.8r	3.2r	143.8	2.5
April	169.3r	0.8r	143.5	1.8
May	170.8r	2.1r	142.9	1.2
June	170.9r	1.5r	144.2	2.9
July	170.4r	0.6r	142.6	0.6
August	169.8r	-0.4r	143.5	1.9
September	168.5r	-1.9r	144.2	2.6r
October	167.1r	-3.1r	141.9	-0.5
November	168.6r	-1.3r	142.6r	0.4r
December	171.6	2.0	144.1	2.1

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

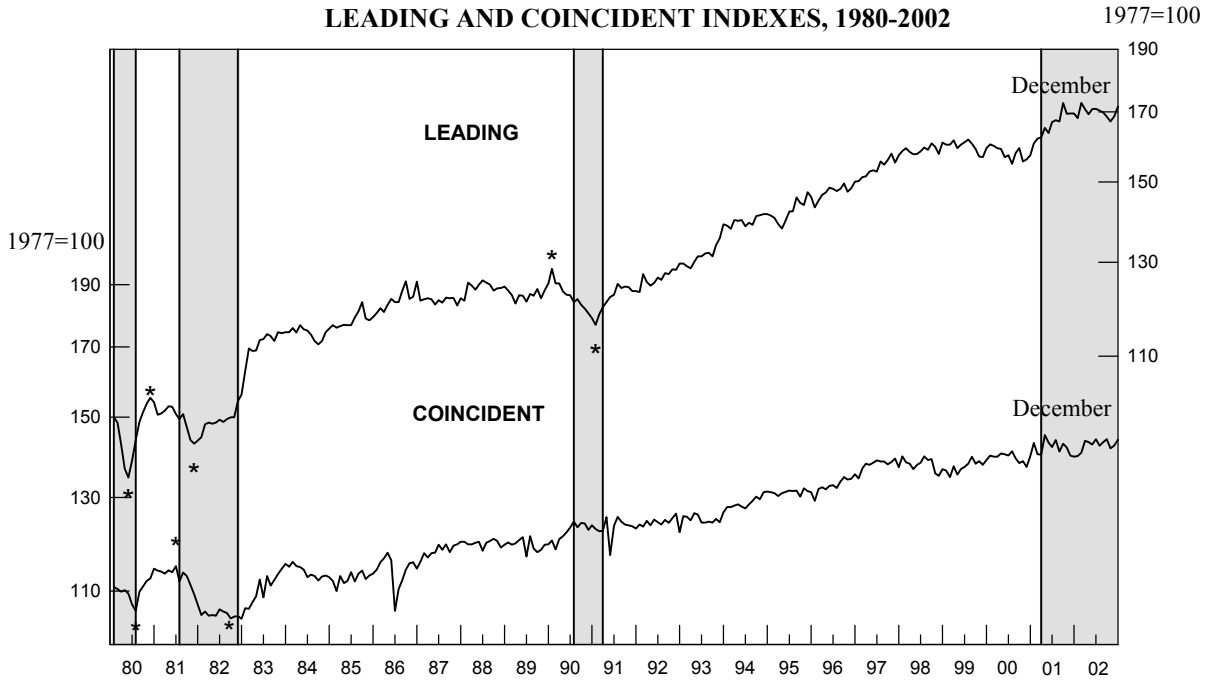
Table 7.
The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**November**	**December**
1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353)	0.3r	0.4
2. Index of new private housing units authorized by permit	-0.1	0.5
3. Retail sales of U.S. passenger cars and light trucks (units)	0.1	0.9
4. Construction contracts, commercial and industrial (square feet)	0.0	-0.1
5. Net new orders for aluminum mill products (pounds)	0.2	-0.5
6. Growth rate of U.S. M2 money supply, 1996$	0.2r	-0.2
7. PMI	0.1	0.7
Trend adjustment	0.2	0.2
Percent change (except for rounding differences)	1.0r	1.9
Coincident Index		
1. Industrial production index, misc. aluminum materials (NAICS 331315,9)	0.1r	0.2
2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353)	0.2r	0.7
Trend adjustment	0.2	0.2
Percent change (except for rounding differences)	0.5r	1.1

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, U.S. Bureau of Economic Analysis and American Automobile Manufacturers Association; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, Institute for Supply Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted.

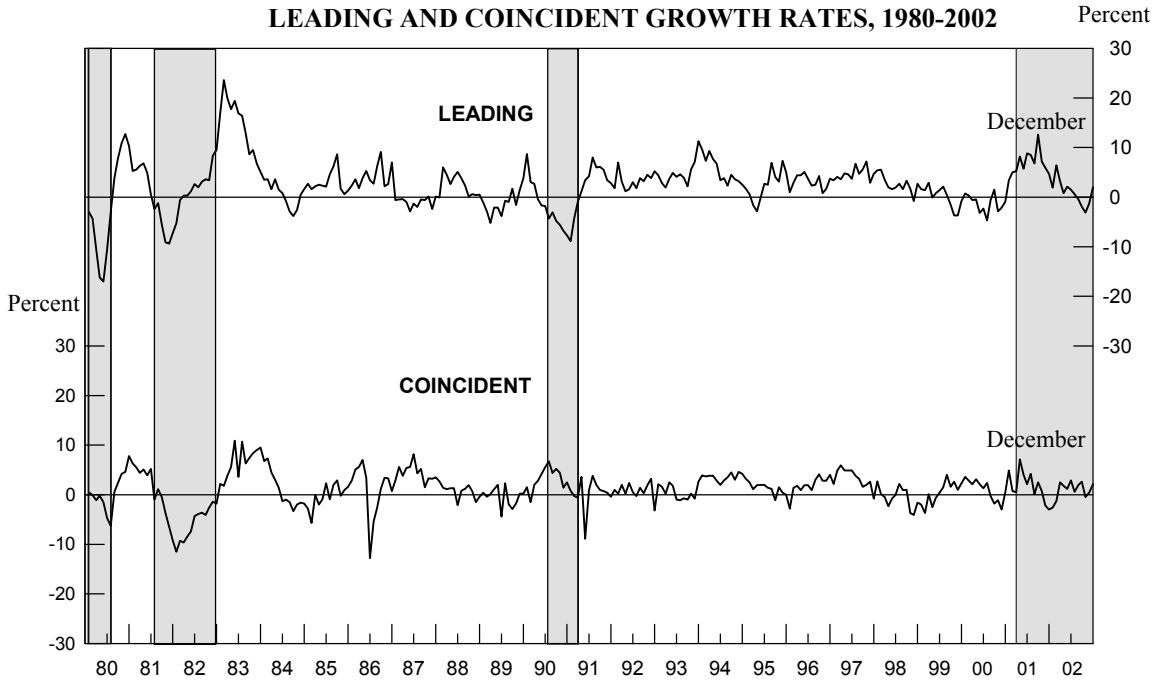
r: Revised

CHART 6.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT INDEXES, 1980-2002



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 7.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT GROWTH RATES, 1980-2002



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, February 2003

Table 8.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2002				
January	116.4	4.1	114.7	-1.3
February	117.8	6.2	113.2	-4.1
March	118.7	7.3	114.7	-1.1
April	119.3	7.4	116.1	1.4
May	119.5	6.5	115.8	0.7
June	118.5	4.2	115.3	-0.2
July	116.9	1.1	115.4	0.0
August	116.5	0.1r	116.2	1.2
September	115.3	-2.0	115.3r	-0.3r
October	114.9	-3.0	115.3r	-0.2r
November	114.3r	-4.2r	113.3r	-3.4r
December	115.7	-2.1	114.9	-0.5

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

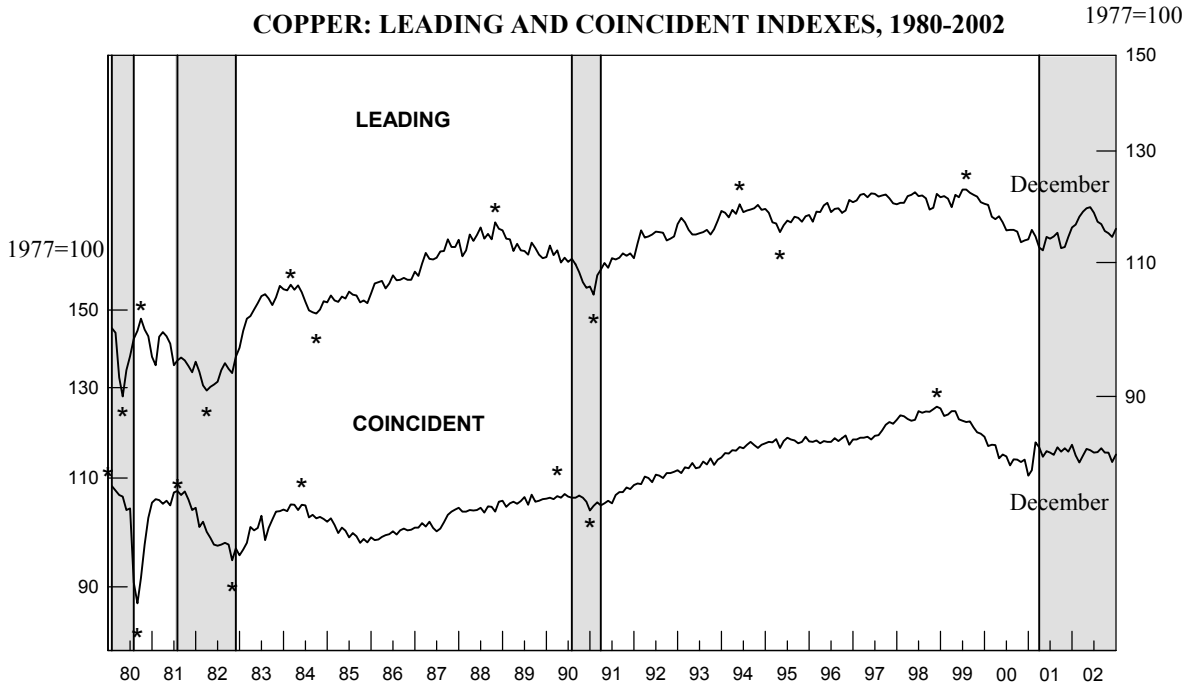
Table 9.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**November**	**December**
1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351)	-1.0	0.7
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982$	-0.4r	0.1
3. S&P stock price index, building products companies	0.4	0.0
4. LME spot price of primary copper	0.2	-0.2
5. Index of new private housing units authorized by permit	-0.1	0.6
6. Spread between the U.S. 10-year Treasury Note and the federal funds rate	0.4	0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.5r	1.3
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (NAICS 331411)	0.0	0.1
2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351)	-1.6	0.9
3. Copper refiners' shipments (short tons)	-0.3	0.3
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-1.8	1.4

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Standard & Poor's; 4, London Metal Exchange; 5, U.S. Census Bureau and U.S. Geological Survey; 6, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3, 4, and 6 of the leading index.

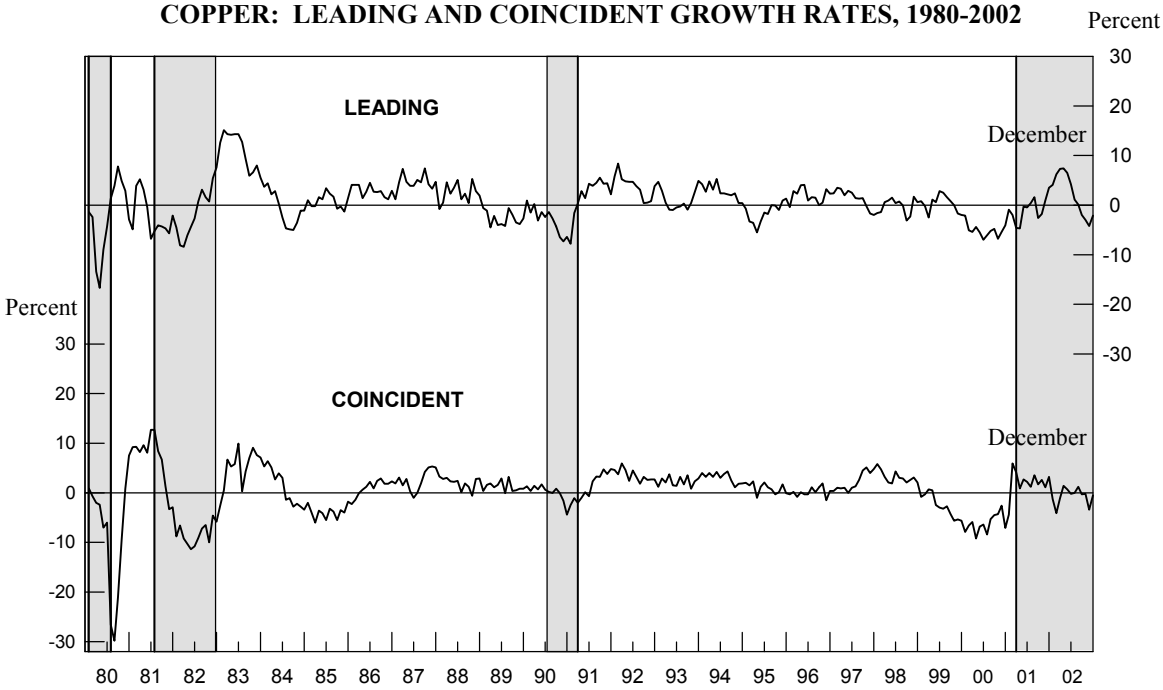
r: Revised

CHART 8.
COPPER: LEADING AND COINCIDENT INDEXES, 1980-2002



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 9.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1980-2002



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, February 2003

Table 10.
The Primary Aluminum Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2002				
January	81.6	-5.2	70.1	-11.5
February	81.1	-5.5	71.0	-7.5
March	81.8	-3.4	72.0	-3.5
April	81.6	-3.4	72.7	-1.2
May	81.9	-1.9	73.7	2.4
June	84.3	4.3	74.7	5.7
July	83.6	2.9	76.0	9.3
August	82.1	-0.4	75.3	7.1
September	80.8	-2.8	75.4	6.9
October	82.3r	0.8r	78.5	14.9
November	83.8r	3.9r	79.4r	15.5r
December	85.1	6.6	79.8	14.8

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 11.
The Contribution of Each Primary Aluminum Index Component to the Percent Change in the Index from the Previous Month

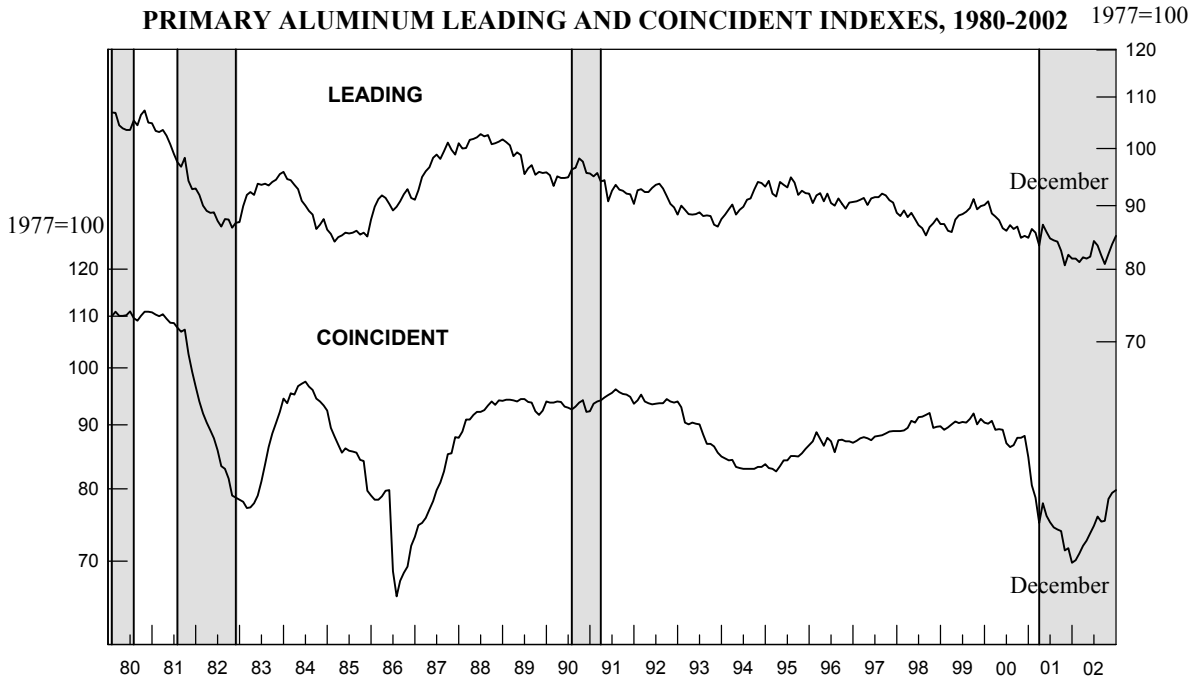
Leading Index	**November**	**December**
1. Average weekly hours, primary aluminum products (SIC 3334)	1.0	1.2
2. S&P stock price index, aluminum companies	0.7	0.0
3. LME cash closing price for primary aluminum ($/ton)	0.4	0.0
4. Industrial production index, misc. aluminum materials (NAICS 331315,9)	0.1	0.1
5. New orders, nonferrous metal products (NAICS 3313, 3314, & 335929) 1982$	-0.4r	0.1
6. Reciprocal, index of the trade-weighted average exchange value of the U.S. dollar against other major currencies	0.3	0.2
Trend adjustment	-0.1	-0.1
Percent change (except for rounding differences)	2.0r	1.5
Coincident Index		
1. Production of primary aluminum (metric tons)	0.5	0.0
2. Total employee hours, primary aluminum products, (SIC 3334)	0.5r	0.5
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	1.0r	0.5

Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, London Metal Exchange; 4, Federal Reserve Board; 5, U.S. Census Bureau and U.S. Geological Survey; 6, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, The Aluminum Association, Inc. and U.S. Geological Survey and 2, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 6 of the leading index.

r: Revised

CHART 10.

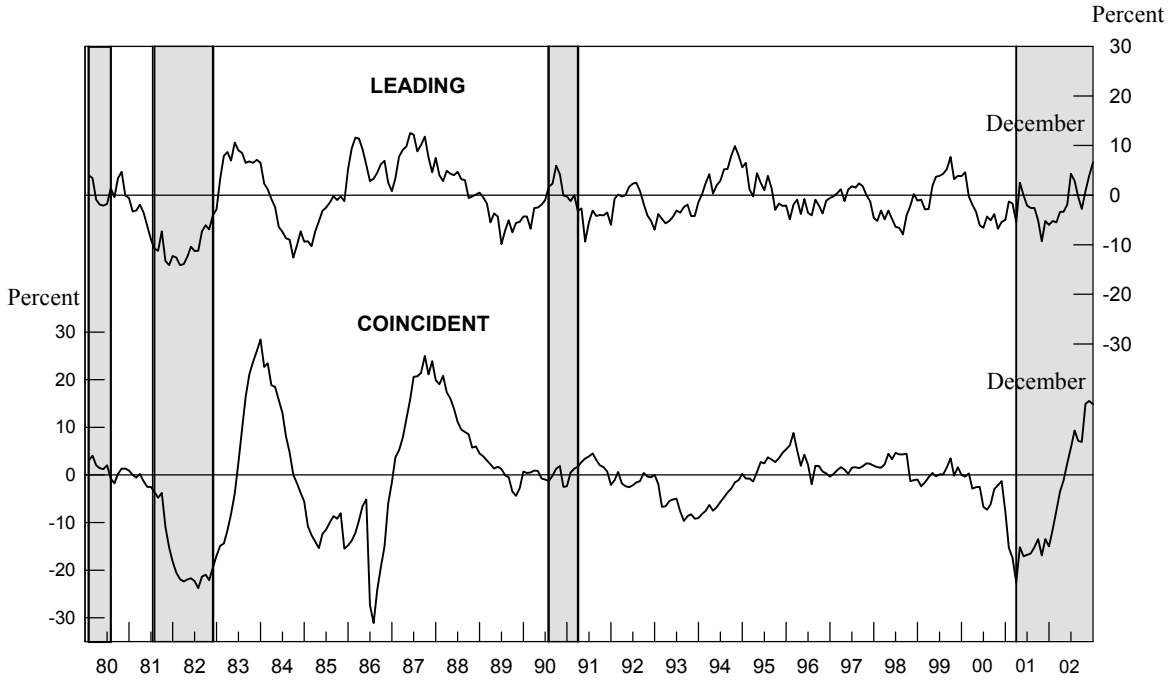
PRIMARY ALUMINUM LEADING AND COINCIDENT INDEXES, 1980-2002



Shaded areas are business cycle recessions.

CHART 11.

PRIMARY ALUMINUM LEADING AND COINCIDENT GROWTH RATES, 1980-2002



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, February 2003

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930s. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.[1]

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

The metal industry coincident indexes reflect industry activity classified by the U.S. Standard Industrial Classification (SIC) and the North American Industry Classification System (NAICS). Of the five metal industries, primary metals (NAICS 331) is the broadest, containing 25 different metal processing industries. Steel, aluminum, and copper are specific industries within the primary metals group.

The SIC was the main vehicle used by the U.S. Government and others in reporting industry economic statistics throughout most of the last century. Starting with the 1997 U.S. Economic Census, the U.S. Government began using the NAICS, which classifies economic data for industries in Canada, Mexico, and the United States. In general, metal industry indexes starting in 1997 begin to reflect the NAICS classification, while indexes for earlier years follow the SIC. Hence, composite indexes from 1997 forward are not entirely consistent with those of earlier years.

The largest change to primary metals because of the NAICS deals with other communication and energy wire manufacturing (NAICS 335929). Under NAICS, this manufacturing has been removed from primary metals and added to electrical equipment, appliance, and component manufacturing. Because monthly shipments and new orders for this wire are not available, the USGS is estimating their values from 1997 onward and adding them to the appropriate metal industry indicators and indexes to maintain consistency.

[1]**Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).

There are other small changes to the primary metals industry because of the switch to the NAICS. Coke oven activity not done by steel mills, for example, is removed and alumina refining, a part of industrial inorganic chemical manufacturing under the SIC, is added. Since the historic trends of the composite indexes are not affected by these small changes, the USGS is not making specific adjustments to the indexes for them for the periods before and after 1997.

The metal industry leading indexes turn before their respective coincident indexes an average of 8 months for primary metals and 7 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the average lead time for the aluminum mill products leading index is 6 months.

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 8 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}}\right)^{\frac{12}{6.5}} - 1.0\right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below –1.0% usually means declining growth.

The next summary is scheduled for release on the World Wide Web at 10:00 a.m. EST, Friday, March 21. The address for *Metal Industry Indicators* on the World Wide Web is: http://minerals.usgs.gov/minerals/pubs/mii/

The ***Metal Industry Indicators*** is produced at the U.S. Geological Survey by the Minerals Information Team. The report is prepared by Kenneth Beckman (703-648-4916; e-mail: kbeckman@usgs.gov), and Gail James (703-648-4915; e-mail: gjames@usgs.gov). The former Center for International Business Cycle Research, under the direction of Dr. Geoffrey H. Moore, and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes in the early 1990s. Customers can send mail concerning the *Metal Industry Indicators* to the following address:

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